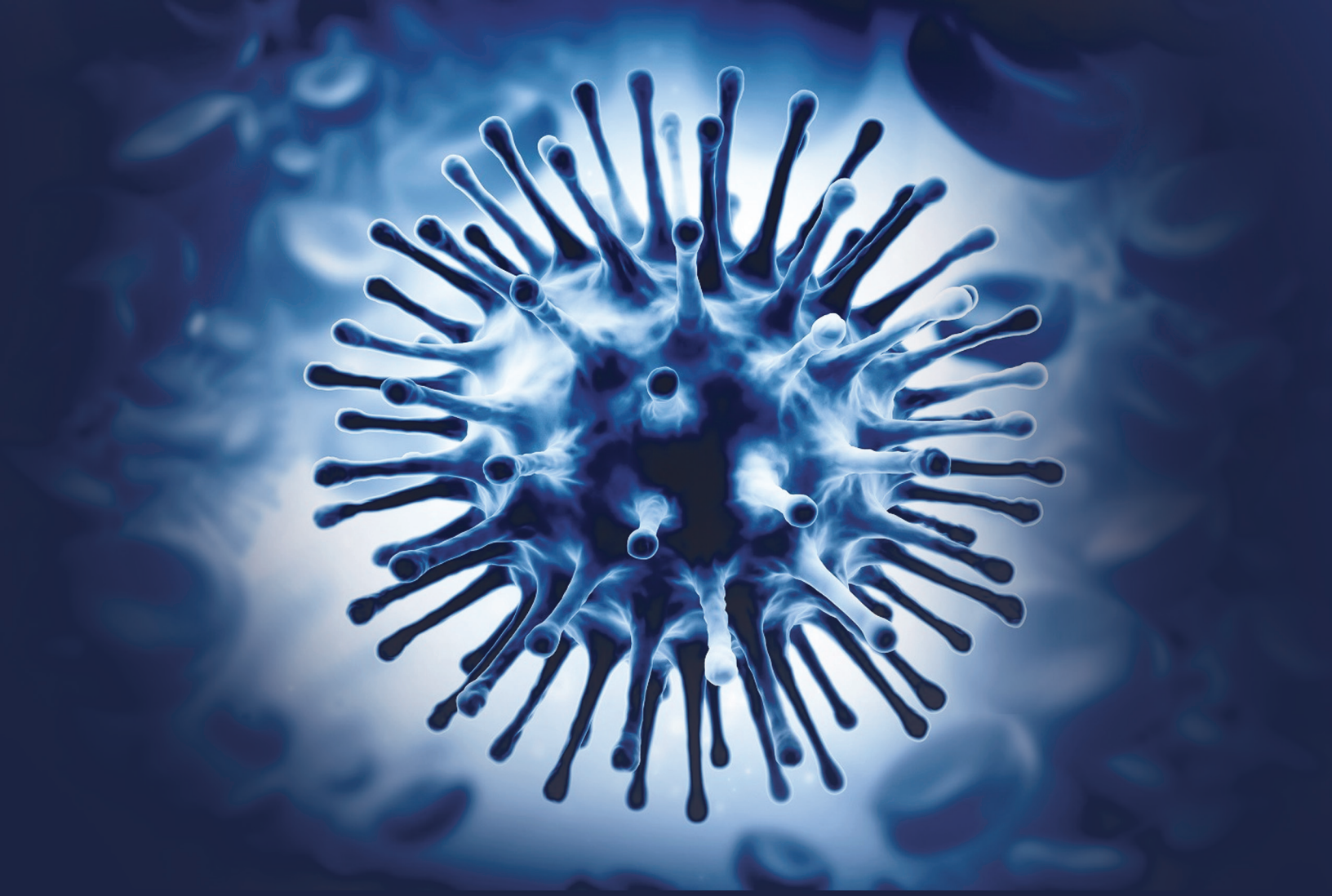

A Scowcroft Institute of International Affairs White Paper

"The Growing Threat of Pandemics: Enhancing Domestic and International Biosecurity."

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The Bush School of Government & Public Service
Texas A&M University

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The Growing Threat of Pandemics: Enhancing Domestic and International Biosecurity

Scowcroft Institute of International Affairs The Bush School of Government and Public Service

Executive Summary

The threat posed by pandemics grows alongside increased globalization and technological innovation. Distant cultures can now be connected in a day's time, and international trade links global health and economic prosperity. In this report, the Scowcroft Institute of International Affairs at the Bush School of Government and Public Service at Texas A&M University details nine priority areas and accompanying action items that will help to address current pandemic response problems.

1. Leadership: Strong leadership in biodefense and pandemic preparedness and response is the first area identified as needing improvement. Following the recommendations made by the Blue Ribbon Panel on Biodefense (2015), we recommend that United States leadership in biodefense be centralized in the White House, specifically within the Vice President's office. Also in line with recommendations made by the Biodefense Panel, we recommend that a Biodefense Council, overseen by the Vice President, be established. Additional action items include the establishment of a new and overarching National Biodefense and Pandemic Preparedness Strategy. Beyond the panel's findings, we recommend a detailed implementation plan, tied to a unified and integrated budget, with built-in accountability to ensure decentralized action. We also call for the reprioritization of national and international pandemic preparedness and response exercises.

2. International Response: We should re-evaluate pandemic response plans—in particular, the need to adopt the World Health Organization's (WHO) reforms: WHO established an advisory group in 2015 to determine ways to improve its response to disease outbreaks and emergencies following an ineffective response to the Ebola outbreak in 2014. We endorse the recommendations for reform provided by the advisory group and urge priority action for reform implementation. We also recommend that WHO Regional Office directors no longer be independent from WHO Headquarters, but report directly to the Director-General. Independence of the regional offices makes a unified WHO response difficult and can impede efficient communication and organization during pandemic response.

3. The Anti-vaccine Movement: The increasing influence of the anti-vaccine movement in the United States is another growing threat. Leaders of the movement spread misinformation to parents with questions or anxiety over the safety of vaccines. Many within

the anti-vaccine movement incorrectly believe that vaccines cause autism, and the number of individuals seeking nonmedical exemptions to the vaccination requirements of schools is on the rise. In some states, like Washington and Texas, this puts public school populations dangerously close to falling below the threshold for "herd immunity," which refers to the percentage of a population that needs to be vaccinated in order to provide protection to those who are unvaccinated. Dropping below herd immunity puts individuals who cannot get vaccinated—those that are either too young or immunocompromised—at great risk. We recommend that public health authorities initiate education campaigns to communicate the risk that vaccine-preventable disease poses to unvaccinated individuals. Additionally, we strongly recommend that states re-evaluate their acceptance of personal belief or philosophical exemptions. These should be removed as exemption options.

4. Animal and Human Health: Next we address the need to bridge the gap between animal and human health. The majority of emerging diseases are zoonotic. Whether due to living in close proximity with animals, destruction and encroachment of habitats, or lack of vaccinations, diseases originating in animals are increasingly making the jump into the human population. Some of our recommendations for bridging the gaps in this area include the following: expanded animal vaccination programs; institutionalization of One Health, a program that creates collaboration between human and animal health care professionals and researchers with the goal of developing an interdisciplinary strategy for animal, human, and environmental health; increased disease surveillance along wildlife/livestock boundaries; and education and training for individuals who live or work in high-risk areas.

5. Uniform Health Screening: There should be uniform health screenings for individuals seeking permanent or extended temporary residence in the United States. Immigrants and refugees are a vital part of American society. The United States must continue to welcome them, but there are currently, discrepancies between the vaccination requirements for immigrants and the vaccination requirements for refugees, which should be made uniform. Immigrants are required to have all their vaccinations before entering the country, whereas refugees are only strongly recommended to do so. There are also limited health screening requirements for individuals who are not seeking permanent residence in the United States. It may not always be possible for refugees to receive their vaccinations overseas, so we suggest requiring immunizations upon entry and requiring health screenings for anyone staying in the US more than three months. We also recommend implementing more risk-based infectious disease screenings that reflect the individual's country of origin.

6. Public Health and Health Care Infrastructure: In many developing countries, there are insufficient infrastructure, expertise, and supplies to adequately provide for

even basic day-to-day health care, let alone to detect, report, and respond to infectious disease outbreaks and other threats as required by WHO's International Health Regulations (IHR). Even the US, which has greater expertise and higher investment in healthcare, struggles with adequate surge capacity in the case of a high-impact infectious disease outbreak or other emergencies. In this section, we recommend investment in host country institutions and restructuring hiring systems for health care professionals in developing countries. In addition, enhanced diplomacy and commitment to the Global Health Security Agenda will help support implementation of the International Health Regulations. We also recommend enhanced foreign aid investments in global health, specifically for pandemic prevention and preparedness, as they are essential to international security and US national security.

7. Effective Outbreak Response: The US is often caught unprepared when an outbreak with pandemic potential strikes. Valuable time is wasted in the existing, cumbersome process of identifying the disease, predicting risk, and acquiring emergency appropriations to respond. To help create a more effective response, we recommend that Congress make funding for diagnostics and biosurveillance a high-priority budget item. In addition, the United States should use the USAID Office of Foreign Disaster Assistance's (OFDA) financial authorities and resources, which are not earmarked, as an international pandemic emergency response fund to reduce the need for supplemental emergency appropriations. We further recommend that the new national biodefense and pandemic preparedness strategy affirm OFDA's role as the lead coordinator of the United States' international response for pandemic emergencies, similar to its lead role for all other international disaster responses.

8. Cultural Competency: Ebola demonstrated that disease control protocols and cultural rituals can collide with devastating results. In this report, we suggest that cultural anthropologists and crisis communicators be consulted and included in US public health missions to other countries.

9. Academic Collaborations: Academic institutions situated in developing countries have pre-established relationships with the affected people in their local communities and regions and will be around long after the acute response phase has ended. There are also growing global academic and scientific university-based collaborations between faculty and students in developed and underdeveloped countries. We suggest building university-based public health extension programs designed to work within local communities and communicate disease research to a nonacademic audience as well as incorporating host country universities and their established, global academic collaborations into the overall disease response.

Introduction

The world is experiencing accelerated levels of change. Massive expansion of global travel; economic interdependence; global supply chains; climate change; urbanization; deforestation; technological advancement; and the expansion of mechanized, scientific commercial food production are just a handful of the changes that have occurred globally in the last fifty to seventy years. Remote villages in Africa are not as disconnected from the US population as they once were, and people are coming in increasingly close contact with wildlife populations around the world. Armed conflict is causing an unprecedented migration of people, and, in fact, the United Nations High Commission for Refugees (UNHCR) reports that there are currently 65 million internally displaced people and refugees—the largest number in history. Air travel allows a person to move around the world in a day. All of these elements play a role in the increasing number of emerging and re-emerging infectious diseases throughout the world.

Preparing for and responding to diseases with pandemic potential is one of the greatest challenges modern society faces. These outbreaks cause loss of life, loss in personal and national income, and foreign policy challenges. The United States government's current response approach relies too heavily on supplemental emergency appropriations from Congress and other donors for the massive funding required. This has the effect of creating a slower than necessary response as organizations are waiting for funds to be allocated before they take action. Once the funds are appropriated, the money must then be spent quickly in an attempt to control the epidemic after it is already out of control.

The Department of Health and Human Services (HHS) and other supporting public health officials need emergency funding authorities and appropriations, similar to the Stafford Act, which is designated for the Federal Emergency Management Agency (FEMA) and other emergency management activities. We support the establishment of emergency funding authority but emphasize that establishing the emergency fund should not cause a reduction in funding for infectious disease preparedness more broadly.

The 2014 Ebola outbreak in West Africa cost the United States government $2.4 billion in response operations. The United States and the rest of the international community spend billions of dollars responding to epidemics and pandemics that occur with greater and greater frequency. This reactive method of disease response is not sustainable and does little to prevent the emergence of infectious diseases at their source. Organizational and funding changes must be made at a domestic and international level to avoid the exponential loss of resources, personnel, economic

development, and human life caused by disease outbreaks. We cannot continue to rely on a reactive strategy.

The importance of preparing for a pandemic cannot be overstated. At the same time, the importance of educated predictions and communication, rather than "crying wolf" every time there is a possible threat, also cannot be overstated. Expressing certainty of a threat that doesn't materialize hurts the credibility of the government—and more specifically, the Centers for Disease Control and Prevention's (CDC) reputation—making it less likely that citizens will take future threats seriously. A prime example of this is the 1976 swine flu outbreak, a virus said to be a direct descendant of the 1918 flu. A massive, nationwide vaccination campaign was launched in preparation for the outbreak. The outbreak America so greatly feared never materialized and, instead, an increased risk of Guillain-Barre syndrome was later linked to the 1976 flu vaccine (CDC, 2015b). This incident resulted in the firing of the CDC director and embarrassment for the federal government as well as laying the groundwork for the distrust of flu vaccines we see today. Despite all of this, the 1976 incident does not diminish the danger posed by infectious diseases, nor does it take away from the importance of preparing for disease outbreaks. Thoughtful, deliberate, near real-time surveillance and epidemiological analysis, diagnostics, and communication are critically important in responding to pandemic risk. Prematurely or incorrectly announcing disease threats can cause backlash and a lack of trust among the public.

Recognizing that we face the threat of pandemics is the first step. Taking action to correct or minimize the threat is the second. This white paper outlines the major obstacles standing in the way of optimal pandemic prevention, preparedness, and response—many of which were discussed during the 2nd Annual Pandemic Policy Summit hosted by the Scowcroft Institute of International Affairs. There are nine problem topics this white paper will cover. These areas are the need for effective, centralized leadership and collaboration and better use of available resources; improved international system response; to counter the anti-vaccine movement and stress the threat from vaccine-preventable diseases; to bridge the gap between animal and human health; implementation of more uniform health screenings and travel education; improved and sustained public health institutions and infrastructure; to respond effectively and in a timely way to disease outbreaks; to establish cultural competency in pandemic response; and to establish and expand the unique role of universities. Each problem outlined in this paper is coupled with action items that will help close the gaps in disease preparedness and response.

This paper aims to create a realistic and effective plan for reducing the threat of pandemics throughout the world. The plan also helps to mitigate the need for large, recurring, supplemental emergency appropriations to respond to outbreaks after they are already beyond control. Many of the intellectual and organizational structures necessary to accomplish pandemic prevention and preparedness

objectives are already in place. However, we must maximize available authorities, budgets, and resources, and the current approach does not do so. The action items put forth below will address major gaps in both US national security and international health security.

As the new administration and Congress refocus priorities on defense and security for the United States, the Scowcroft Institute maintains not only that enhanced global health foreign aid and other related investments targeted at pandemic prevention are in our national security interest but moreover that subtle efforts/investments toward prevention will be much less costly than the reactive strategy we find ourselves in today.

Problem Topic 1: Leadership, Collaboration, and Accountability

Problem Statement:

Fragmentation and a lack of coordination, integration, and communication within multilateral international organizations and domestic government agencies tasked with pandemic preparedness and control pose a threat to rapid and efficient disease response.

Background:

Emerging infectious diseases with pandemic potential can have a global effect and are spread more easily by the travel and trade structures that serve as the backbone for global commerce. Due to the international nature of pandemics, there are often many government authorities and nongovernment organizations (NGOs) involved in preparedness, response, and recovery. While the contribution from various areas of international and domestic government can be beneficial in terms of resources, it often complicates the actual response process through confused lines of authority, a lack of ability to effectively integrate resources, and communication obstacles.

At the international level, WHO serves as the main authority in public health. WHO was established in 1948 as an entity of the United Nations (UN) and includes more than 190 member states. WHO's mission is to provide leadership on health matters, guide the global health research agenda, provide technical support, monitor health trends, and develop ethical and evidence-based policies. Although the organization was originally established to tackle global infectious diseases, WHO has expanded its scope and today pursues a comprehensive health agenda. WHO plays a primarily supportive role but has also assumed an emergency response leadership role to support member states and emergency responses involving cross-border and multiple-state needs. Most member states, other multilateral organizations, and NGOs look to WHO for leadership during epidemics and pandemics.

The WHO enterprise includes the headquarters located in Geneva and regional offices. The Regional Office for Africa; the Regional Office for the Americas, which is also the

Pan-American Health Organization (PAHO); the Regional Office for Southeast Asia; the Regional Office for Europe; the Regional Office for the Eastern Mediterranean; and the Regional Office for the Western Pacific provide WHO presence on six of the seven continents. The role of these offices is to address health issues that may be specific to the region, and they are the first point of contact when there is a suspected infectious disease within their region. One of the challenges that WHO faces, however, is that it relies heavily on information and cooperation from its regional offices and the member states it serves. WHO deploys personnel and can make recommendations for action, but, ultimately, disease detection, reporting, and response are the responsibility of the affected WHO member states.

Several after-action reports regarding the Ebola 2014 incident, including WHO's own report, were highly critical of WHO's response to the outbreak. Shortcomings and needed reforms have been identified that require priority attention, as the global community needs effective WHO participation and leadership going forward.

In addition to WHO, there are three other international health organizations of consequence. The first of these is the Pan-American Health Organization (PAHO), which operates much like WHO but only extends its authority to North, Central, and South American countries. It operates independently, providing health leadership to almost fifty countries, but it also serves as a regional office for WHO. One of the most important roles of PAHO is to help set the health agenda for the Americas and to provide technical assistance for health issues.

The last two international organizations of consequence to pandemics are the World Organisation for Animal Health (OIE) and the Food and Agricultural Organization of the United Nations (FAO). OIE was implemented by an international agreement in 1924 and is tasked with controlling animal disease at a global level. FAO is an entity of the UN with the purpose of eradicating hunger and food insecurity. The role of FAO in pandemic preparedness and response may not be quite as obvious as the other organizations, but the natural and bioterrorist threat to agriculture presents a food security challenge that would likely fall under its purview. The majority of emerging infectious diseases with pandemic potential are zoonotic. The growing recognition for the need to apply One Health approaches—which integrate all aspects of animal, human, and environmental health care through worldwide, interdisciplinary collaboration—to controlling high-impact emerging infectious diseases makes close collaboration between WHO, OIE, and FAO critical.

In the US, there are many organizations and government officials involved in preparing and responding to pandemics at federal, state, local, and tribal levels. At the federal level alone, there are at least ten departments and

agencies and over fifty presidentially appointed, senate-confirmed individuals that have biodefense responsibilities (Larsen et al., 2015).

The Pandemic Influenza Implementation Plan identifies two departments with more significant leadership roles in pandemic response: the Department of Health and Human Services (HHS) is the lead for federal medical and public health response, and the Department of Homeland Security (DHS) is the lead in overall domestic incident management and federal coordination.

As such, the Secretary of HHS is the lead for federal public health and medical response during a domestic infectious disease outbreak. The Assistant Secretary for Preparedness and Response (ASPR) was created by the Pandemic and All Hazards Preparedness Act (PAHPA) in 2006 and serves as the Secretary's principal advisor on all matters related to public health, medical preparedness, and response for public health emergencies. Although some argue that Congress intended for the ASPR to lead all federal interagency biodefense efforts, including pandemic response, that mandate is not authorized by legislation or executive action. The ASPR *did* establish the Public Health Medical Countermeasures Enterprise (PHEMC) to coordinate medical countermeasure preparedness and response activities across HHS, including activities of the Department of Homeland Security (DHS), United States Department of Agriculture (USDA), Department of Defense (DOD), and Veterans Affairs (VA).

Within HHS, the Centers for Disease Control and Prevention is the major operational division for public health preparedness and response. Its role includes conducting the majority of human infectious disease surveillance, maintaining public health laboratory capabilities, and supporting state and local public health for preparedness planning and response activities. Several other staff and operating divisions in HHS also have significant roles, including the Centers for Medicaid Services, the National Institutes of Health, the Federal Food and Drug Administration, the Assistant Secretary of Health, the Surgeon General, and others.

The Secretary of Homeland Security serves as the principal federal official for domestic incident management and coordinates the overall federal response, assuring the full function of the nation's critical infrastructure. The Secretary is also responsible for setting reporting requirements and communicating with all entities involved in the response. Within DHS, however, there are many organizations that are involved in a pandemic response. These include the Federal Emergency Management Agency (FEMA), US Customs and Border Protection, the Transportation Security Authority (TSA), the Office of Public Affairs, and the US Coast Guard. Each of these organizations plays a separate role in the response, including screening of potentially sick individuals and referring people to public health quarantine authorities. DHS also has a responsibility to mitigate the entry of contaminated products into the country by screening vessels, trucks,

aircraft, and other forms of commerce when they reach the border or port of entry.

The United States Department of Agriculture (USDA) is responsible for inspecting all animals and plants entering the United States, but it is also the main agency tasked with responding to animal disease outbreaks. Though USDA is often overlooked when discussing issues of human health, its surveillance of animal health can be an important tool in preventing zoonotic outbreaks. Unfortunately, the links between animal and human surveillance are extremely limited, and wildlife surveillance is in a different department altogether (Department of the Interior). There is also a significant funding disparity between animal and human health at a time when a One Health approach has become increasingly important to pandemic prevention.

The Department of Defense is another major stakeholder in pandemic preparedness and biodefense. Pandemic preparedness is critical for DOD to ensure that force projection, which is the ability to project national power through military operations, is not impeded in the event of a severe infectious disease outbreak. DOD is also responsible for protecting service members and their families worldwide. DOD has unique planning logistics, and command and control capabilities can be called upon to support humanitarian relief as well as global and domestic natural disaster response. The 2014 Ebola outbreak in West Africa was the first time that major DOD logistical, engineering, and command/control capabilities were deployed outside of the US/internationally for an infectious disease outbreak.

The military and DOD have a long history of distinguished accomplishments in infectious disease research and public health for US military personnel, in collaboration with our strategic allies. DOD has world-class research centers and biocontainment laboratories working on defense and the control of high impact infectious diseases, including the United States Army Medical Research Institute of Infectious Diseases and the Walter Reed Army Institute of Research. The latter includes a network of international research laboratories that are strategically located in areas of the world to enable international public health collaboration, disease surveillance, and local response, as well as further regional diplomacy.

Several other departments at the federal level have significant responsibilities, including Department of State, Department of Labor, Department of Education, Department of Transportation, Federal Aviation Administration, and Department of the Interior. The United States Agency for International Development has unique authorities and lead responsibilities for coordinating the United States' response to international humanitarian and other disasters, along with a Global Health Bureau that deals with infectious disease and public health programs from a development perspective.

In the US, while several federal organizations have authorities and oversight responsibilities for pandemic preparedness, state and local authorities on the frontline are ultimately responsible for an infectious disease response in their communities. These include governors, mayors, tribal leaders, and their associated government public health and emergency management officials, as well as private sector health care providers and businesses. The National Guard also has a local or state level role in pandemic response if activated by a governor.

"…we need strong leadership to enable effective decentralized execution across the biodefense enterprise…"

Further, the Blue Ribbon Panel on Biodefense reported that there are at least twenty-five policy documents (legislation, national strategies, and executive orders) covering biodefense and pandemic preparedness. We do not lack for policy documents, but we do suffer from both competing and overlapping strategies, which further complicate our response efforts. We need a new, overarching national strategy coupled with an implementation plan to provide focus on priority actions and accountability for all levels of government and to provide better guidance to nongovernment organizations.

To overcome the difficulties of diffuse and competing interagency organization and ensure better utilization of available resources, we need strong leadership to enable effective decentralized execution across the biodefense enterprise for defense against biological threats—whether natural, accidental, or intentional. The Blue Ribbon Panel on Biodefense discussed this recommendation extensively in the 2015 report. The need for effective leadership was more recently addressed by the President's Council of Advisors on Science and Technology. The Biodefense Panel recommended that leadership for biodefense be centralized with the Vice President of the United States and that a White House Biodefense Coordination Council to coordinate and integrate the work of all the agencies and departments working on biodefense and pandemic preparedness should be established. The Panel further recommended that the Vice President and a Biodefense Coordination Council establish a new, overarching national biodefense strategy with clear metrics and then hold departments/agencies accountable for achieving outcomes. Some argue that improved biodefense and pandemic preparedness may not require substantial new funding but rather refocus of priorities, accountability, and better use of available resources. The Scowcroft Institute concurs with the Panel's leadership recommendations and the need to use available authorities and resources more effectively. We extend the Panel's recommendation for a national strategy to include a detailed implementation plan with clearly identified lead

and supporting roles for priority action items tied to a unified, integrated, and comprehensive budget.

Forming a biodefense council under the purview of the Vice President will help to clarify who the response authority is at the domestic level. The same must be done with regard to the United States government response to international disease outbreaks. The international arena can be even more complicated to navigate, making it more necessary to have clear and established lines of authority prior to a pandemic response. The new national biodefense strategy and implementation plan should affirm USAID's Office of Foreign Disaster Assistance (OFDA) as the lead in coordinating the United States' response to pandemics overseas, just as it is the lead for United States government response to all other international disasters.

While the OFDA office already responds to an average of sixty-five disasters per year, the 2014 Ebola outbreak was the first time that USAID/OFDA Disaster Assistance Response Teams (DART) were deployed in response to a pandemic (OFDA, 2017).. OFDA has the demonstrated experience, personnel, and expertise to effectively lead future international pandemic response efforts. In FY 2015, USAID/OFDA provided over $1.6 billion for disaster response activities, in addition to almost $90 million in community disaster preparation and mitigation (USAID, 2016). In coming years, Congress and the White House should continue to provide funding for OFDA's international response activities in a manner that allows the agency to expand response into the realm of pandemics. With existing legislative authorities, staffing, and a discretionary emergency response budget, USAID/OFDA is the best equipped agency to lead and coordinate federal response efforts to global pandemics.

Making sure that international pandemic response is rapid and effective will require more than just putting USAID/OFDA in charge, however. In addition to officially designating OFDA as the lead organization in response, clear lines of authority must be established between USAID/OFDA, DOD, HHS, the State Department, and any other federal organizations that may be called upon. Supporting agencies must know and understand their roles and responsibilities. We suggest the development of an International Response Framework, analogous to the National Response Framework for domestic response, that outlines each organization's role in the response and clarifies lead and supporting responsibilities.

Although centralized leadership in the United States is vital to developing effective pandemic response, it is also important that collaboration with the international community be strengthened. Pandemic response requires a unified effort by members of the international community, including a reformed WHO, the United States, other donor and recipient members, and affected country governments. If these entities are not able to work together and communicate to the public

with a unified, coherent message, the pandemic response will be undermined. Having centralized US leadership may make it easier to strengthen and clarify interactions with a reformed WHO, but this will need to be supplemented by culturally appropriate communication and training regarding countries likely to be affected by a pandemic in order to increase response effectiveness.

Beyond government organizations, there are still barriers to effective collaboration and divisions among institutions and individuals. Researchers are working in a range of disciplines, including infectious diseases, biology, chemistry, psychology, communication, political science, and anthropology. As pandemics are interdisciplinary, these researchers should reach out to each other to address the problem of pandemics more holistically. Researchers whose work is applicable to elements that impact disease response must collaborate in order for the United States to devise the best possible disease prevention, containment, and response policies and plans. Unfortunately, these academic institutions and research institutes often have "silos"—or barriers to effective multidisciplinary collaboration. New models of collaboration, such as a One Health approach, can overcome these barriers and effectively bridge gaps across traditional organizational boundaries in both government and nongovernment organizations. Universities also have growing international faculty and student collaborations that are an underutilized resource for pandemic preparedness and response and that could prove particularly useful at linking science, policy, local communities, and affected individuals.

Recommendations and Action Items:

There are many US government departments and agencies involved in pandemic planning and response, and the bureaucracies associated with these departments and agencies resist ceding power or territory. The threat of future pandemics and our vulnerabilities require strong leadership paired with the ability to better coordinate and integrate capabilities across all levels of government (federal, state, local, and tribal) and the private sector with a sense of urgency, priority, and maximization of available resources. Nationally, aside from the President and Vice President, the private sector and academia have the greatest ability to galvanize state, local, and tribal authorities. The following action items underscore the Blue Ribbon Panel's first three recommendations.

1. Establish strong, centralized leadership at the highest level of the federal government. Biodefense and pandemic preparedness leadership must have the ability to transcend internal bureaucratic strife; allow new evidence-based approaches to have a fair debate; make difficult decisions; and, importantly, develop an integrated biodefense budget tied to a new national strategy. Leadership needs to be at a level in the White House that can influence and galvanize action by state, local, and tribal governments, as well as nongovernment organizations. The ultimate goal of strong centralized leadership

is to enable effective and focused decentralized implementation with better utilization of available resources and existing authorities.

2. Establish a biodefense policy coordination committee that focuses on preparedness and is not diluted by day-to-day exigencies. The policy process must include the ability for state, local, and tribal governments, as well as nongovernment organizations to provide input into the deliberative and planning processes.

3. ***Establish a new and overarching National Pandemic Preparedness Strategy, followed by a detailed implementation plan that identifies lead and supporting roles and organizations and that is tied to a national, integrated pandemic preparedness budget, as a detailed line item in the President's budget request.*** The implementation plan should include milestones and metrics and should hold departments and agencies accountable for action. The 2017 National Defense Authorizing Act requires DOD, HHS, DHS, and USDA to establish a new national biodefense strategy. The Scowcroft Institute applauds Congress for enacting this requirement, and recommends that Congress exercise stringent oversight responsibilities to ensure a sound strategy, including metrics for accountability, is established, implemented, and monitored.

4. Prioritize national and international-level pandemic preparedness and response exercises and "breath life" into plans and exercises. Pandemic preparedness exercises/simulations are key to ensuring the best response because they give individuals and organizations an opportunity to work together in an outbreak scenario and help solidify/secure/develop/chains of command/authority and lines of communication before a real outbreak occurs. Simulations also allow officials to see what parts of the preparedness and response plans are working well and what areas need revision. It is important to make the exercises as real-life as possible by creating short deadlines, uncertainty, and the need to coordinate multiple agencies in a high-stress environment. This will provide individuals participating in the exercise the greatest learning experience.

5. Affirm USAID/OFDA as the lead US government international pandemic response. OFDA already has the pre-existing expertise, unique legal and acquisition authority, logistic capabilities, and staff to succeed in this role. The United States government's international pandemic response needs a system in which White House leadership can instill discipline in the response effort and that works effectively with members of the international community throughout the response. OFDA is the most readily equipped to fill this role.

6. The United States should support WHO reforms that enable its effective leadership in a new era of global health financing at a time when WHO faces significant criticism as a result of the delayed international response to Ebola. This will require sustained, if not enhanced, US government global engagement for effective pandemic

preparedness planning and will help overcome any challenges that jeopardize timely WHO reform. WHO's structural, financial, management, and other organizational challenges require major reform and priority action. The Director-General has stated her commitment to implementing recommended reforms to improve emergency response, but implementation requires support by the entire WHO enterprise, including the United States. As an action item under leadership, new White House and HHS leadership should start working with WHO and other strategic international partners immediately to develop better action plans for pandemic response and to identify how best to help WHO overcome challenges to reform. This should include communication guidelines to avoid contradictory messages from the two organizations.

Problem Topic 2: Restructuring the International System Response

Problem Statement:

The current international response system for pandemics is dysfunctional and needs reform.

Background:

Following the 2014 Ebola outbreak in West Africa, WHO faced significant criticism for its management of the response, characterized as slow, disorganized, and inadequate. Member states further criticized WHO for being politicized and biased. Largely due to the backlash after Ebola, Director-General Margaret Chan called for reform and established the Advisory Group on Reform to Analyze WHO's Work in Outbreaks and Emergencies with Health and Humanitarian Consequences. This advisory group began work shortly after it was established in summer 2015.

To date, the advisory group has issued two reports, the first released on November 16, 2015, and the second issued on January 18, 2016. Both reports recommend that WHO develop a unified platform that draws on all organizational resources to fight disease outbreaks. The report termed this platform the Programme for Outbreaks and Emergencies and suggested the program be led by an Executive Director, who would report directly to the Director-General. Further, the platform should have "one budget, one workforce (reporting to the Executive Director); one line of managerial authority; consistent procedures for supporting operations across the organization; specifically designed processes for managing human resources, finances, procurement, and logistics; and one set of performance benchmarks to be applied across the organization" (Second Report of the Advisory Group on Reform of WHO's Work in Outbreak and Emergencies, 2016). The program is designed to correct WHO's fragmented and slow response to Ebola.

The creation of the outbreak and emergencies program was just the first major step toward WHO reform. The advisory group also suggested that WHO work with local, national, and regional governments throughout their

"As it currently operates, WHO is not effective at meeting the needs of all member countries with regard to panemic preparedness and emergency response."

member states to create more resilient health systems prior to a disease outbreak. Despite a lack of extensive information about how this would be accomplished, there was mention of training local health care workers to function as first responders during an outbreak. We also suggest that building up diagnostic capabilities and developing laboratory availability are vital to effectively creating a resilient health system and member states' International Health Regulation compliance.

The advisory group report proposes an alternative method for establishing an emergency health care workforce that relies much more heavily on involvement from a variety of sectors. This recommendation from the report coincides with building resilience, as the advisory group believes that training the local workforce to respond to pandemics will provide an emergency health care workforce that is less dependent on a surge response from WHO and other member states. While this recommendation *is* valuable and training the local health workforce to serve as part of the emergency response is a good way to expand the emergency response team, it is also important to have scale-up capacity within the actual WHO response workforce. This is not something that is included in WHO's reform recommendations.

The advisory group also recommended that WHO maximize its existing funding mechanisms—they provide the Central Emergency Response Fund, for example—and develop a contingency fund. The advisory group set the capitalization goal for this contingency fund at $100 million, but, as of February 2017, the fund had only $32.65 million available (WHO, 2017). In order for this contingency fund to be effective, it needs to attract greater levels of funding that can make it effective/useful in combatting future diseases. Member states and the global community cannot ask WHO to do more without commensurate member state commitments to perform essential emergency outbreak response functions.

Lastly, the advisory group on WHO reform identified the need to accelerate research and development with regard to disease outbreaks and emergencies. They mention the importance of extending partnerships and looking at different categories of donors, including the private sector. By extending partnerships, particularly in the private sector, the advisory board states that WHO will be able to make real progress in increasing its ability to respond appropriately and innovatively to disease outbreaks. It should be noted, however, that there is a great deal of bureaucratic inertia *against* the reforms across the WHO

enterprise, including from some member states. Despite the potential benefits of these changes, the desire to continue business as usual may be more powerful. The Scowcroft Institute stresses that this challenge to WHO reform must be overcome. As it currently operates, WHO is not effective at meeting the needs of all member countries with regard to pandemic preparedness and emergency response. Without implementation of these reforms, enhanced financing with demonstrated better use of available resources, and the support of all member states, inadequate responses will continue, generating frustration among the global community. This could lead to the emergence of alternative structures that would further fracture an already shaky global health leadership landscape.

Recommendations and Action Items:

1. ***WHO must implement the advisory group's reform recommendations*****.** Without implementation of these reforms, WHO is not able to meet the needs of its member states during outbreaks and emergencies. The 2014 Ebola outbreak in West Africa demonstrated exactly how badly these reforms are needed. By most accounts, WHO responded too late and in a fashion that provided little assistance to countries in need during Ebola. These failures must be corrected before the next major pandemic. If WHO is unable to implement timely reforms, the United States, in coordination with strategic international partners, should explore alternative pandemic emergency response models under the United Nations, such as through the United Nations Office of Coordinating Humanitarian Affairs. If this shift becomes necessary, it should include the reallocation of a portion of US financial contributions normally directed to WHO. This reallocation should instead be sent to a new United Nations structure for pandemic emergency response.

2. ***Regional offices should not be independent and, instead, should report directly to the Director-General.*** While the advisory group makes an attempt to streamline the work and communication between WHO headquarters and its regional offices, the group still allows the regional offices to operate independently. If regional offices are allowed to maintain independence from headquarters, challenges with communication and response organization will continue. Instead, regional offices should operate as part of the hierarchy of the main organization. Requiring regional directors to report to and implement decisions from the Director-General will help WHO have a more cohesive response during disease outbreaks and emergencies. If the regional offices must report to WHO headquarters, there will be less delay in response, as funding and physical support typically must come from outside the regional offices. This structure would allow WHO headquarters to establish more stringent reporting requirements for regional offices in the hope of eliminating reporting and response delays.

Problem Topic 3: The Anti-vaccine Movement and the Re-emergence of Vaccine-Preventable Diseases

Problem Statement:

Anti-vaccination activists contribute to the re-emergence of vaccine-preventable diseases, which has become a serious public health problem in the United States and elsewhere. The anti-vaccine movement has the potential to impact biodefense and pandemic vaccine availability, which could make life-saving vaccines unavailable as a component of a future comprehensive public health response.

Background:

Vaccines are one of the greatest public health advances of the 20th century. During the early 1900s in the United States, childhood mortality was staggering, rivaling what we recognize today as third world suffering. Infectious diseases, many of which are now preventable through vaccines, were at the top of the list of childhood killers. The Centers for Disease Control and Prevention estimated that the lives of 732,000 American children will be saved, and 322 million cases of childhood illnesses will be prevented due to vaccinations children received between 1994, at the start of the Vaccines for Children Program, and 2013 (CDC, 2014). WHO similarly reports that vaccines prevent an estimated 2 to 3 million child deaths (WHO, 2016e). Smallpox, feared for centuries, was declared eradicated by the WHO in 1980 through an aggressive global immunization campaign. Polio, also feared for causing paralysis and death, has been eliminated in the United States and most of the world, with less than 100 cases reported globally in 2015—also a result of a global immunization campaign. Similarly, measles, mumps, rubella, pertussis, and other diseases were once associated with significant morbidity and mortality until immunizations decreased disease incidence by over 99 percent in the United States. Unfortunately, many of these diseases have not been eliminated globally and still threaten parts of the developing world, where vaccine access is not prevalent. In addition to the international impact, the US can be directly impacted when citizens travel abroad and infect their local communities upon their return.

Because vaccines and immunization campaigns have been so successful, parents today have not witnessed firsthand the epidemics these illness can become. They do not appreciate the serious and potentially catastrophic consequences vaccine-preventable diseases could have on their children, families, and communities if allowed to return unchecked. Similarly, many front-line health care providers would not recognize or even consider these diseases in their initial differential diagnosis due to their low frequency of occurrence and their own unfamiliarity with these diseases that were once so common.

The adoption of widespread, population-based, mandatory immunization using safe and effective vaccines is largely responsible for this successful eradication. Mandatory

vaccination laws were first enacted in the early 19th century to combat smallpox in Massachusetts. In 1905, the United States Supreme Court upheld the authority of states and municipalities to pass compulsory vaccination laws that gave state and local public health authorities prerogative over individual choice to protect the public's health and safety in the event of communicable diseases (Swendiman, 2011). Mandatory municipal and state-based vaccination policies have subsequently been adopted by all states. Today, modern childhood vaccination laws prescribe specific vaccine requirements for entry into schools, preschools, and child care facilities.

As with any vaccine or drug, there is always the possibility of adverse reactions as well as medical contraindications for some individuals. Because of this, every state allows vaccination exemptions, with exemption allowances varying by state. All states allow medical exemptions in the event a vaccine is contraindicated for a child that is immunocompromised, allergic to a vaccine or its excipients, or has other medical contraindications to receiving a vaccine. All but three states also allow for nonmedical exemptions, though the types and enforcement of these nonmedical exemptions varies by state. Reasons for/types of nonmedical exemptions include religious, philosophical, and personal beliefs. For example, some religions like Jehovah's Witnesses may avoid some modern medical practices and science. The number of children not receiving vaccines due to nonmedical personal belief exemptions is on the rise. In fact, the frequency of parents developing a personal belief that vaccines are not safe has put some communities at a heightened risk of community-level outbreaks.

The last ten to twenty years have seen a re-emergence of vaccine-preventable diseases that coincides with the rise of nonmedical exemptions. Most recently, this has caused high-profile, multistate outbreaks of measles, pertussis, and mumps.

What is causing this re-emergence of vaccine-preventable diseases, and why is this a relatively new phenomenon? A review of multiple studies exploring these phenomena in detail points to decreasing vaccine uptake in communities as a major factor, but not the only factor, tied to the re-emergence of vaccine-preventable diseases (Phadke, Bednarczk, Salmon, et al., 2011). For example, decreased immunizations are largely responsible for increased measles outbreaks. Pertussis outbreaks are also associated with decreased vaccination rates. But waning immunity is also a factor, as some don't realize that the effectiveness of the vaccine decreases over time. Nonetheless, a clear pattern has emerged where parents, often from affluent communities, are electing to seek nonmedical exemptions to avoid immunizations for their children.

Seemingly well intentioned but misguided parents avoid vaccines because of their concerns about vaccine safety. Through nonexpert or falsified information, they are led to

believe there is a causal link between vaccines and autism. Well-organized, anti-vaccine activists are igniting this fear through misinformation that is contrary to prevailing scientific evidence, which shows no link between vaccines and autism.

Societal avoidance and resistance to vaccines is not a new phenomenon. Vaccine resistance dates back to soon after Edward Jenner discovered that inoculation of cowpox pustules induces protective immunity to smallpox. Since the discovery of vaccines by Jenner, resistance movements have come and gone and have, at times, become very emotional, leading to irrational fears.

Today, vaccine research, development, manufacturing, use, and post-marketing surveillance are highly regulated by the FDA. Childhood vaccines have advanced tremendously over the last fifty years and are as safe and effective as ever.

The contemporary anti-vaccine resistance movement is, in some respects, similar to resistant movements that preceded it. Unlike previous movements, however, current efforts are based on fraudulent data accompanied by intensive misinformation campaigns. The use of personal belief and philosophical exemptions is reaching a crisis point and has serious implications for modern society and health security.

The contemporary anti-vaccine movement stems from a widely debunked study published by a British physician/scientist in the journal *The Lancet* nineteen years ago (Wakefield, 1998). In that study, the author reported that twelve children who received the measles, mumps, and rubella (MMR) vaccine developed what, appeared to be autism—implying a causal link. The claims made in the article ignited fear in society at large about the safety of vaccinations. This fear led to decreased vaccination rates, followed by measles, mumps, and rubella outbreaks in Europe and the United States.

Subsequent investigations into the original 1998 study revealed that the author had a significant financial conflict of interest and had committed other ethical and scientific breaches while conducting the research. The editorial board of *The Lancet* retracted the publication twelve years later in 2010, and the UK body for medical examiners revoked the author's medical license that same year. In 2011, *The British Medical Journal* published an editorial about the investigation into the 1998 *Lancet* paper in which they concluded the research was an elaborate fraud. Unfortunately, the damage to public health, families, children, and communities had already been done, and the perception of a link between MMR vaccines and autism persists.

Subsequent pivotal epidemiological studies have concluded there are no links between the active or inactive substances in vaccines and autism (CDC, 2015c; Taylor, Swerdfeger, Eslick, 2014; Jain, Marshal, Buikema, Bancroft, Kelly, and Newschaffer, 2015). Although recent progress has been made in research to better understand the cause or causes of autism, there are many unanswered questions. Childhood immunization, however, is not one of the causes. The unanswered questions regarding the cause of autism continues to breed fear of the unknown. It is understandable that parents may be vulnerable to misinformation campaigns. Unfortunately, these same parents are also unaware of the threat of measles, mumps, rubella, and other infectious diseases, as modern society has lost appreciation of the dangers of infectious diseases that are now largely prevented by vaccines.

Anti-vaccine activists exploit the fear and uncertainty surrounding autism, and they play on deeply ingrained emotions regarding personal sovereignty that conflates compulsory vaccination for public health as a violation of personal choice. Anti-vaccine advocates challenge sound public health recommendations, arguing that government is superseding individual choice. They also argue that the government is hiding the connections between vaccines and autism to protect pharmaceutical companies. This distrust of government has created another very difficult obstacle for scientists to overcome. Science is often dismissed by the anti-vaccine movement as a cover-up. The work of anti-vaccine activists is succeeding with devastating results.

"The work of anti-vaccine activists is succeeding with devastating results."

This puts children who are unvaccinated by parental choice and those that are too young or ill to be vaccinated at risk of serious illness or death. The choice of parents not to vaccinate their child not only impacts their individual child but also is a threat to the greater public health of the community.

At a national level, vaccination rates are still high, but there are communities across the country where vaccination rates are below the level thought to be required for "herd immunity." This means that those within the communities with true medical exemptions and infants too young to be vaccinated are at heightened risk of contracting a potentially fatal vaccine-preventable disease.

Despite the hard work of public health and medical professionals, the scientific-based defense of vaccines is having minimal effect in slowing the growth of the anti-vaccine movement. In fact, the movement is gaining momentum, particularly in the state of Texas, where personal belief exemptions have sky-

rocketed to the tens of thousands.

As serious as the threat from the anti-vaccine movement is to families and communities, its impact could also extend to national security and public health preparedness for biodefense and pandemics. A comprehensive and rapid public health response is vital to detect, prevent, and respond to a bioterror attack or the emergence/re-emergence of infectious diseases with pandemic potential.

The deployment and use of vaccines is an important component of a comprehensive public health response, and vaccine preparedness remains a health security priority. If segments of the population are unwilling to receive vaccinations in emergency situations, it will be impossible to contain a bioattack or emerging disease. It is difficult to predict the exact impact the anti-vaccine movement may have on pandemic response, but it is possible that activists could impact political will to an extent that support for pandemic and biodefense vaccine initiatives could lose public support and necessary funding. If this occurs, the future of pandemic and biodefense preparedness is in jeopardy.

Recommendations and Action Items:

1. Public health authorities and community leaders must educate communities and families on the dangers of vaccine-preventable diseases since the public is no longer aware of the threat. Parents have been bombarded by conflicting and, in some cases, fraudulent information regarding vaccine safety and potential links between vaccines and autism despite overwhelming scientific evidence that contradicts those claims. Furthermore, most parents have never experienced the suffering and death that can result from vaccine-preventable diseases, such as measles, mumps, rubella, and pertussis. Anti-vaccine activists exploit parental fears and lack of experience with infectious disease dangers with great success.

Public health authorities and other trusted community leaders at state, local, and tribal levels must confront anti-vaccine activists and educate the public about the threat of the diseases these vaccines are designed to prevent.

2. State legislatures and governors must consider legislative revisions to require stricter criteria for granting personal belief exemptions and/or consider eliminating personal belief exemptions entirely. Personal belief exemptions vary by state and, unfortunately, nonmedical exemptions have grown with dangerous consequences. Accompanying the decrease in vaccination rates is an increase in vaccine-preventable disease outbreaks. Some states, particularly those that have direct experience with these outbreaks, are considering changes to nonmedical exemptions. As an example, California eliminated personal belief and religious vaccine exemptions following the 2014 multistate measles outbreak that could be traced back to exposures at Disneyland. The law eliminating these exemptions—California

Senate Bill 277—went into effect at the beginning of the 2016/2017 school year (Seipel, 2015).

Establishing compulsory vaccine requirements is a state responsibility. All state legislatures and governors should review their existing laws and policies and make revisions to reduce or eliminate nonmedical exemptions. Although vaccination laws fall under state authority, the President should encourage all governors to take this action.

3. The administration and Congress should continue to support research to ensure that vaccines remain safe and effective and accelerate basic research to unravel the true causes of autism.

The public needs to be assured that day-to-day use of childhood vaccines remain safe and effective. The government should take all necessary actions to provide confidence to parents that they are making wise decisions to immunize their children and should continue to aggressively pursue scientific understanding for the true causes of autism and related ailments.

Problem Topic 4: Addressing the Link between Animal and Human Health

Problem Statement:

The majority of emerging infectious diseases are zoonotic and circulate in animal reservoirs before they cross over to infect humans.

Background:

Approximately 75 percent of human emerging infectious diseases are zoonotic—naturally transmitted between animals and people—and enter the human population through human contact with animals (Wolfe et al., 2005). Some well-known zoonotic viruses include Ebola, severe acute respiratory syndrome (SARS), Nipah, influenza, HIV, and rabies. This brief list shows that zoonotic infectious diseases are some of the most threatening diseases society faces, and their number and frequency will only continue to grow.

One prominent example of a zoonotic disease outbreak is the 1918 influenza pandemic. This outbreak killed an estimated 50 to 90 million people worldwide.

The 2003 SARS outbreak demonstrated that a zoonotic disease does not have to have high mortality to cause significant damage. SARS

"SARS demonstrates that even without huge loss of life, zoonotic diseases can have devastating effects."

had a relatively low transmission and mortality rate, but it had a large economic impact on the countries involved. For example, SARS resulted in a 1.05 percent loss in GDP for mainland China; a 2.63 percent loss in GDP for Hong Kong (Lee & McKibbin, 2004); and an estimated $1 billion loss in Toronto due to decreased tourism, air traffic, and retail sales (CBC News, 2003). It is estimated that the global economic loss due to SARS in 2003 was approximately $40 billion (Lee & McKibbin, 2004). SARS demonstrates that even without huge loss of life, zoonotic diseases can have devastating effects.

There are a number of reasons for the increase in zoonotic disease prevalence. One of the biggest reasons is the change in human population density and lifestyle. This driver of emerging zoonotic disease is a multifold problem. Humans and animals are coming into contact more frequently and sometimes for the first time due to increased deforestation and urbanization. Loss of habitat forces wildlife to move outside their comfort zones to find food. Additionally, when deforested land is used for agriculture, farm animals come in close contact with wildlife. Contact between domestic animals and wildlife can lead to infections in domestic animals that are then transmitted to humans. This is exactly how Nipah virus first entered the human population. The virus is traditionally carried by fruit bats but human encroachment into fruit bat territory in Malaysia brought infected fruit bats and pigs into contact in 1998 (Chua et al., 1999; Paton et al., 1999; WHO, 2016b). The pigs then transmitted the disease to humans, and this outbreak resulted in the identification of the Nipah virus (WHO, 2016b).

Working hand-in-hand with deforestation, the building of logging roads provides access to previously inaccessible areas of the forest. Bush meat hunters are able to utilize these roads and come into contact with a wider variety of wildlife (Wolfe et al., 2005). This allows for diseases that may have existed in a wildlife population for decades to be transmitted and emerge within the human population. Once a disease makes contact with humans, it is able to begin changes to be more suitable for human-to-human transmission.

Although wildlife does serve as the main source for many emerging zoonotic diseases, domestic animals also play a role. Domestic swine often serve as a "mixing vessel" for influenza viruses, and they can serve as an intermediary, as they did for the Nipah virus. In developing countries, the dog population is the main source of rabies infection. Cats in the developed world are the main source for toxoplasmosis. Diseases from domestic animals can also have an impact on food safety. Some of the most common food-borne diseases throughout the world are caused by *E.coli*, *Salmonella*, and *Listeria*. These diseases are able to infect humans through unwashed meat, meat that has not been properly cooked, or unpasteurized dairy products and juices.

Population growth, translocation, and human behavior is changing the world, and many of

these actions are bringing wildlife in closer contact with human populations. There does not appear to be an end in sight for many of these ecological changes, meaning we will continue to see new, emerging, and re-emerging zoonotic infectious diseases spilling over into the human population.

There have been attempts to tackle the challenges posed by zoonotic diseases, but most programs and funding are distinct for either human health or animal health. The CDC recently established the National Center for Emerging and Zoonotic Infectious Diseases (NCEZID), however, which addresses the human-animal health link. Nonetheless, effective linkages between animal and human health remain elusive.

An approach that is gaining attention for addressing the animal, human, and environmental nexus is One Health, which seeks to bring together multidisciplinary expertise in animal and human health and the associated environmental ecosystems. The goal of One Health in this context is to fully address biological threats—whether natural or man-made— in a transdisciplinary manner by integrating research, knowledge, and other defense mechanisms, including all aspects that can impact human health. In order for this program to become effective, a One Health approach needs to be institutionalized and recognized at the federal level across departments/agencies, particularly HHS, USDA, USAID, DHS, Department of Interior, and even DOD. Today, USAID is ahead of other agencies, applying One Health approaches through its emergency pandemic threats program in the Bureau of Global Health.

Similarly, One Health needs to be applied locally by NGOs and universities toward the prevention of zoonotic infectious diseases at their source.

Recommendations and Action Items:

1. ***There should be an expansion of vaccination programs for livestock, domestic animals, and wildlife.*** Some countries already have extensive animal vaccination programs, but other countries do not. Lack of vaccination can lead to deaths by vaccine-preventable diseases. Bangladesh is an excellent example of the positive impact expanded vaccination programs can have. In 2010, the country began a campaign to eliminate rabies by conducting mass dog vaccinations and increasing the availability of free vaccines. In the three years following the initiation of the program, the number of human rabies deaths decreased by 50 percent (WHO, 2016d). As this example demonstrates, vaccination programs for animals can have the indirect effect of protecting the human population.

2. ***Increased disease surveillance at the animal-human and wildlife-domestic animal interface is urgently needed.*** Increased surveillance is particularly important in high-risk areas. Examples include the Zoonotic Disease Unit in Kenya, which is developing capabilities for rapid detection, response, and control of zoonotic diseases using a One

Health approach, and increased risk-based infectious disease surveillance and monitoring along the borders of Kruger National Park in South Africa to check for tick-borne disease transfer between wildlife and domestic cattle populations. Other examples include monitoring of animals and humans in deforested areas globally, especially in areas close to new forest boundaries and disease surveillance along logging roads and in areas known to consume bush meat. Resources are limited, so it is important to approach increased surveillance using a risk-based approach, focusing in areas with high-risk behaviors. Focusing surveillance in this manner increases the likelihood of detecting an infectious disease outbreak before it becomes a pandemic. Biosurveillance research in these hot spots must also be increased to better understand virus evolution and the events that trigger spillover from animals to humans.

3. ***Institutionalize education and clinical training for individuals, families, communities, workers, and health care personnel living in high-risk areas.*** Education about the diseases in the region, disease symptoms, and what should be done if individuals suspect they have contracted a disease will help to reduce the time between infection, reporting, and treatment. Education about how to prevent infection could reduce the risk to individuals living in high-risk areas or living high-risk lifestyles.

4. ***Institutionalize One Health and apply One Health approaches to pandemic prevention.*** This was a recommendation made by the Blue Ribbon Study Panel for Biodefense. One Health is intended to promote multidisciplinary collaboration between researchers and other nongovernmental officials. The concept of integrating the knowledge and study of animal, plant, and human health is vital for protecting the United States from naturally occurring and man-made diseases. This integration should become more formalized across the federal interagency and implemented by NGOs, particularly in global high-risk regions where epidemics and pandemics are more likely to emerge.

Problem Topic 5: Implementing a Uniform Health Screening System for the United States

Problem Statement:

Current health screening procedures are not sufficient to minimize the risk of infectious disease entry into the United States.

Background:

Immigrants and refugees are an important part of American society. They enrich our melting pot culture and often bring with them expertise in areas that contribute to the economic well-being of the United States. Regarding refugees specifically, the United States has an obligation to provide sanctuary to peoples fleeing violence and persecution. There are, however, inconsistencies in the health screening system for individuals seeking residence in the United States. Health

screening must be made uniform to protect both the American population and the populations of immigrants and refugees entering the country.

In the United States, the CDC oversees the health screening requirements for people entering the country. Every refugee or immigrant applying for permanent admission into the United States must undergo a medical examination. If the screening occurs outside the United States, it must be performed by a panel physician. A panel physician is an overseas medical professional who has an agreement with the local US embassy or consulate general to perform immigration medical exams (CDC, 2015). These physicians work closely with the US Department of State to make sure that comprehensive medical examinations are given. Any immigrant or refugee found to be a drug user or to have a "communicable disease of public health significance" or a mental health disorder that could pose a danger will not be allowed to enter the country (CDC, 2017). Communicable diseases affected by this order include pandemic flu, SARS or Middle East respiratory syndrome (MERS), viral hemorrhagic fevers, cholera, diphtheria, infectious tuberculosis, plague, smallpox, yellow fever, or any communicable disease that is a public health emergency of international concern (CDC, 2017).

Once they have arrived in the United States, most immigrants are not required to undergo any further medical examination. The purpose of the overseas and in-country medical examinations is to identify health conditions that would prohibit entry into the United States. Additionally, these screenings provide refugee populations the opportunity to receive vaccinations for vaccine-preventable diseases and to receive treatment for parasitic diseases.

The components of the medical examination include a physical and mental examination, syphilis serology testing, review of vaccination records, and chest radiology. The purpose of the chest radiology is to determine if there is a chance the person has tuberculosis. If the chest x-ray shows potential for tuberculosis, additional testing is done. If immigrants or refugees are found to have tuberculosis, they are required to be treated before they enter the country. Treatment before entry is also required for sexually transmitted diseases and Hansen's disease (CDC, 2015).

Tuberculosis is the number one concern for individuals entering the country. The current rate of tuberculosis in the United States is 3 cases per 100,000 persons. Worldwide, however, tuberculosis is one of the top ten causes of death, with one-third of the world's population being infected. According to the World Health Organization, 1.8 million people died of tuberculosis in 2015 and ~500,000 people developed multidrug resistant tuberculosis (WHO, 2016). Because of the high prevalence of tuberculosis outside of the United States, screening incoming immigrants and refugees for the disease is a high priority.

Vaccinations also play an important role in an immigrant's ability to get a visa for permanent resident status inside the United States. While there is some flexibility regarding what vaccinations the person must receive, the CDC puts forth three main requirements for immigrant vaccination: 1) the vaccines must be age appropriate, 2) the vaccines must protect against a potential infectious disease outbreak; and 3) an individual must receive vaccines that protect against diseases that have been eliminated or are in the process of being eliminated from the United States. The vaccines required of immigrants coming to the US include mumps, measles, and rubella; polio; tetanus and diphtheria; pertussis; *Haemophilus influenza* type B; hepatitis A; hepatitis B; rotavirus; meningococcal disease; varicella; pneumococcal disease; and seasonal influenza (CDC, 2012). However, these vaccination requirements only apply to immigrants; routine vaccinations are not required for refugees before they enter the United States (CDC, 2016b). Instead, refugees must show proof of vaccination at the time they apply for permanent resident status (CDC, 2017), and children must be properly vaccinated before they can be integrated into the United States' school system (CDC, 2016b).

The difference in vaccination requirements for immigrants and refugees is a significant gap in the health screening system. Because refugees are fleeing violence and persecution, it can be difficult for them to receive all vaccinations before they enter the United States; however, they should be required to receive all routine vaccinations upon entry rather than when they get settled. Changing this requirement not only will help to prevent disease outbreaks in the United States but will protect the refugees themselves from becoming ill or dying from vaccine-preventable diseases. The Scowcroft Institute recommends that the entrance requirements for vaccination be made uniform.

"The difference in vaccination requirements for immigrants and refugees is a significant gap in the health screening system."

Another major shortcoming of the health screening system is the lack of screening for travelers or those with temporary stay visas. Medical screenings are only required for individuals applying for permanent status in the United States. The lack of screening for individuals coming for extended stays in the United States but not seeking permanent residence status is a gap in border health screening that potentially opens the United States up to a greater threat of infectious disease.

The duty of screening immigrants falls to the CDC and, more specifically, the Department of Quarantine and Migration. The congressional funding request for this department for FY2017 is $47 million, which is $15 million

above last year's request (CDC, 2016). Continued increases in funding for Quarantine and Migration are important to fill the existing gaps in the health screening system. Immigrants looking for permanent status in the United States are responsible for the cost of their health screenings overseas; those seeking visas for stays longer than three months should be required to do the same. Medical care for refugees, however, often falls on various levels of United States government. With approximately 80,000 refugees entering the United States every year, resources to enable uniform health screening and immunizations will be needed, and existing health provision programs should be leveraged to cover increased cost to minimize the burden to local communities for this national health security gap.

Recommendations and Action Items:

1. ***Implement required infectious disease screenings for immigrants and refugees based on diseases that are endemic in their country of origin or the country they have been residing in prior to entry into the United States.*** While some infectious disease screenings, such as tuberculosis, are already required, these screenings should be expanded. Immigrants or refugees found to have an infectious disease should have to wait for entry until they have reached a non-infectious state. For refugees, this may mean holding them in a facility on US soil until they are no longer contagious. HIV should also be re-included in the required testing, but a positive result should not mean exclusion from entering the United States. Instead, the test result should be used to notify individuals and provide them a link to public health resources.

2. ***Implement limited infectious disease screening for travelers staying in the United States more than three months.*** Much like the infectious disease screenings for immigrants and refugees, these individuals should be tested for infectious diseases that are endemic in their country of origin or the country they are residing in prior to visiting the United States. They should also be tested for the "communicable diseases of significance" listed previously.

3. ***Require vaccinations for refugees upon arrival rather than when they apply for permanent status.*** This requirement will both help protect the American population against diseases and protect the refugees coming into the country from vaccine-preventable diseases.

4. ***The administration and Congress should fully support resource requirements for the CDC Department of Quarantine and Migration and ensure that risk-based, time-appropriate measures for refugee equalized medical screening and immunizations are resourced.*** The administration should conduct a cost-benefit analysis and identify existing health provision programs to cover costs to limit the burden to local communities for this health security need.

Problem Topic 6: Building and Sustaining Public Health Infrastructure

Problem Statement:

Many developing countries do not have the basic public health or medical infrastructure to prevent, detect, and rapidly respond to infectious disease events, let alone large outbreaks that require surge capacity. Even the American health care system does not have adequate surge capacity infrastructure to deal with large-scale outbreaks of infectious disease.

Background:

One important element of effective infectious disease response is the ability of hospitals and public health entities—including diagnostic laboratories—to respond rapidly and efficiently. During a major disease outbreak, hospitals see a surge in the number of patients. Some of these patients may have been sick for a long time before coming in to the hospital, and some patients may only think that they have contracted the disease—though, this "walking well" phenomenon is likely more prevalent in the United States than in the developing world. The large influx of patients created by an infectious disease outbreak puts more strain on hospitals, which may not even be able to meet basic needs under normal health conditions.

Many hospitals, clinics, and laboratories in developing countries lack the equipment, training, and staff necessary to detect and respond to an infectious disease. In a study conducted by Beracochea, Dickerson, Freeman, and Thomason (1995), researchers found that only 24 percent of health care workers in a health center in Papua New Guinea were able to correctly identify the treatment for malaria. Likewise, a 1998 study conducted in Pakistan found that only 35 percent of health care providers met the acceptable standard of treatment for viral diarrhea (Thaver, Harpham, McPake, & Garner, 1998). Even with the 2014 Ebola epidemic in West Africa, we saw that the lack of equipment as simple as gloves helped perpetuate the infection. Many developing countries stricken by the HIV/AIDS epidemic have the capacity to test for the disease but are not able to access any treatment. This problem is particularly prevalent in remote areas (Moten, Schafer, and Montgomery, 2012). As of 2014, only 64 of 196 member states report compliance with the revised WHO International Health Regulations that went into force in 2007, and this is likely an overstatement as member states' compliance has not been independently assessed (Katz R and Dowell SF). Whether the problem is lack of personnel, lack of training, lack of supplies and equipment, lack of funding, or all of the above, many hospitals and clinics in developing countries are not even able to meet the basic health care needs of their community. In the case of an infectious disease outbreak, they would be virtually helpless to stop it.

For countries in the developing world affected by conflict, the infrastructure challenge becomes even greater. For example, a 2004-2005 outbreak of Marburg hemorrhagic

fever in Angola was spread in part by health care centers reusing needles and syringes because the fighting had left them with a persistent lack of supplies (Gayer, Legros, Formenty, and Connolly, 2007). Conflict also exacerbates the problems with adequate and trained health care personnel because many choose to flee the country due to the violence.

Although the health care struggles of developing countries may seem like worlds away, they pose a domestic threat to the health of Americans and should be an area on which the United States government focuses aid resources. Due to the ease and relative affordability of air travel, along with extensive global trade, there are people and goods moving throughout the world in a matter of hours. As we have seen with Ebola and Zika viruses, the infectious disease threats of developing countries no longer stay in developing countries. The public health infrastructure problems of Africa or Southeast Asia are now global problems , and not investing in the public health infrastructure of these countries could lead to serious disease challenges here at home.

Domestically, Smith (2010) found that most emergency departments and inpatient facilities at hospitals in the United States are operating at or near 100 percent of capacity on a daily basis. All over the country, hospitals are diverting over half a million ambulances a year because their emergency rooms are already overcrowded (Institute of Medicine Forum on Medical and Public Health Preparedness for Catastrophic Events, 2010). These studies show that the majority of hospitals around the United States are already maxed out on an average night. What if they had to deal with hundreds of additional people flooding their emergency rooms?

Many hospitals throughout the United States have infection control professionals, 24-hour infection control support, and non-health care facility surge beds—but almost 20 percent of hospitals lack any sort of surge capacity plan (Rebmann et al., 2007). Additionally, less than half the hospitals across the country have a plan for rapid set-up of negative pressure rooms and few to no hospitals can handle a surge that is greater than one hundred patients (Rebmann et al., 2007). The situation becomes even more dire if the pandemic were to be a disease that causes respiratory failure. The majority of hospitals in the United States cannot handle more than ten additional patients that need ventilators (Rebmann et al., 2010). This means that if there were to be a large-scale outbreak of a disease like SARS or influenza, hospitals throughout the country would not be able to care for the number of people in need.

"The problem of insufficient infrastructure is a global problem with implications for our homeland security."

The problem of insufficient infrastructure is a global problem with implications for our homeland security. If localized outbreaks become regional epidemics and/or global pandemics because laboratories, clinics, and hospitals in developing nations do not have the ability to rapidly detect and control outbreaks, then the devastation caused by high-impact infectious diseases will enter the United States, where we would face our own surge capacity struggles. Contributing expertise, personnel, and resources to help build and strengthen public health infrastructure and train health care workers in developing countries is vital to controlling and responding to the next major outbreak so it does not become a pandemic. This requires more than just training people and constructing and equipping structures. It requires establishing institutions in host countries that have their own indigenous capabilities and requires that newly trained and educated professionals remain or return to their host countries.

Recommendations and Action Items:

1. ***Invest in public health infrastructure and public health capacities in developing countries.*** In developing countries, many of the health care systems are government funded, and the funding is based on tax revenue. There is financial involvement from private entities to help bolster the health care system as well as foreign investment from the World Bank, WHO, donor nations, and other philanthropic organizations, though the focus is generally on controlling specific diseases rather than improving overall systemic infrastructure. This is a result of funding specific diseases through vertical programs versus establishing horizontal capabilities for an all-hazards approach. Through the Global Health Bureau, USAID also has enhanced efforts to control infectious disease through the Emerging Pandemic Threats program. This program began in 2009 and operates within the One Health approach. The Emerging Pandemic Threats program is doing important work in pandemic preparedness by building One Health capacities in "hot spot" countries and by increasing our ability to understand and prevent zoonotic spillover events, but the continuing deficiency of public and animal health infrastructure in developing countries demonstrates that this program, and other global health security programs like it, needs to receive increased funding and support in order to be successful. Both CDC and USAID have shown their commitment and demonstrated performance regarding public health infrastructure and institutional building. As the new administration and Congress look to refocus federal priorities on defense and security, the Scowcroft Institute strongly recommends that continued and even enhanced global health foreign aid to fight high-impact infectious diseases is a national security priority. The United States should continue to dedicate funding and resources to building and strengthening infrastructure in high-risk underdeveloped countries as a pandemic prevention, mitigation, and response measure in a way that is tailored to establish indigenous host country capabilities toward achieving global health security. In addition,

the United States cannot afford to lose momentum in the fight against HIV/AIDs, tuberculosis, and malaria and should continue financial and programmatic support.

2. ***USAID should partner with national governments in developing countries to help them reform their health care hiring systems.*** The United States already provides large sums of money to train health care personnel around the world, but there are areas still struggling with health care providers who are unable to diagnosis routine and endemic diseases. Rather than putting increased focus on training, some attention and funding should be given to make sure that the health care professionals being hired are competent and qualified and that they will remain in their local institutions and host countries.

3. ***The United States should continue high-priority support and leadership for the Global Health Security Agenda.*** This includes diplomatic engagement to ensure investments are made by other donor countries and philanthropic organizations to build needed global public health capacities, along with multilateral monitoring of progress to achieve compliance with the WHO International Health Regulations required of all member states. Importantly, the Global Health Security Agenda should move beyond a cookie-cutter approach to health institution building to a more decentralized, less standardized approach to better account for local culture and local institutions.

Problem Topic 7: Decreasing Response Time

Problem Statement:

The response time for disease identification, reporting, diagnosis, and response must be reduced.

Background:

Since the 2001 anthrax attack, 2003 SARS pandemic, 2005 H5N1 outbreak, and the H1N1 pandemic in 2009, the United States has increased its focus on pandemic preparedness. From 2006 to 2009, the United States allocated $5.62 billion through an emergency supplemental appropriation to strengthen domestic and global preparedness for an H5N1 influenza of pandemic potential (Schuchat, Bell, & Redd, 2011). The majority of the funding was focused on developing antivirals, vaccine R&D and surge manufacturing, and strengthening public health infrastructure (Schuchat et al., 2011). While all of these elements are important for pandemic preparedness, the importance of developing and fielding better diagnostic tests and strengthening biosurveillance has been undervalued.

With regard to diagnostics, there is significant need for more funding or a shift of available funding to diagnostic research and development. As discussed earlier, many pandemics begin in developing countries with limited health care and laboratory infrastructure. Because of this reality, we need to develop diagnostic tests that can work in limited-resource settings at point of care

(Caliendo et al., 2013). Diagnostics must be able to run without electricity and withstand temperature extremes and power surges (Caliendo et al., 2013), or they will be of limited use in many developing countries. Diagnostics also need to be portable and require minimal training so that they can be taken into the field and widely used by the public health professionals participating in the response. It is also important that diagnostic platforms are applied and used in day-to-day public and animal health applications.

Rapid and accurate diagnostics, coupled with effective reporting systems, will allow medical and public health professionals to identify infectious diseases in less time and take appropriate public health actions, including isolating a potentially infectious patient from the rest of the population.

Coupled with the importance of improving rapid diagnostics is expanding and strengthening biosurveillance systems. Many developing countries throughout the world have limited or nonexistent surveillance programs. For example, prior to the implementation of the Early Warning and Response Network in Southern Sudan in 1999, it had taken over six months to respond to a relapsing fever outbreak the year before (Gayer et al., 2007). For many diseases, particularly airborne diseases like influenza, having a six month lag in response time is unacceptable.

WHO identifies three types of global surveillance: 1) active, 2) passive, and 3) sentinel. Active surveillance is present when designated surveillance staff regularly visit health care facilities, talk with health care professionals, and look into medical records (WHO, 2016c). These staff members are looking for suspected cases of disease, and when one is found, they document the clinical symptoms and collect epidemiological data (WHO, 2016c). The active method of surveillance is only used when attempting to eliminate or eradicate a disease.

Passive surveillance is based on the regular reporting of disease data from participating health care institutions, such as hospitals, laboratories, and private practitioners (WHO, 2016c). Once the data are received, they have to be analyzed to determine any potential patterns. Determining patterns can help public health officials identify potential disease outbreaks. This effort is is based on the cooperation of the health care system, so if some entities are not reporting the information, this may leave a gap in health knowledge. The other challenge with passive surveillance is that many countries simply do not have the resources to identify and report all cases of disease (WHO, 2016c). Identifying disease requires good diagnostics, trained laboratory technicians, and equipped laboratory networks—capabilities that are often lacking in developing countries. Therefore, although this is the least expensive type of surveillance, it is also the least effective.

The final type of surveillance is sentinel surveillance. This is used when there is a need to

learn more in-depth information about a specific disease and it is not possible to gain this information through the passive surveillance system (WHO, 2016c). Sentinel surveillance gathers focused data from a limited number of sources rather than attempting to gather data from sources across the nation or the world. This type of surveillance can be effective in identifying outbreaks or disease trends, but it is more likely to miss rare diseases or any diseases that occur outside of its small area of surveillance (WHO, 2016c). Additionally, WHO has the Global Oubreak Alert and Response Network, which ensures that there is technical expertise on the ground during an infectious disease outbreak. Dr. David Heymann wrote a Scowcroft paper detailing the importance of this program for effective disease response.

Within the United States, there is also the National Notifiable Disease Surveillance System (NNDSS). This system facilitates the sharing of information among local, state, territorial, federal, and international public health entities (CDC, 2015). It is specifically focused on helping these organizations share disease-related information and utilizes a number of different mediums. The goal of NNDSS is to help keep all public health organizations informed of disease-related events that could impact their communities.

The final type of surveillance worth mentioning is the Program for Monitoring Emerging Diseases (ProMED). This is an internet-based network run through the International Society for Infectious Diseases. It has the goal of rapid dissemination of disease-related information and has been designed to serve as an early warning system. It proved its value in the 2003 SARS outbreak. Many Canadian public health officials first learned about SARS (at that time a still unnamed disease) from the ProMED system. The system currently has a presence in approximately 185 countries and gathers information from media reports, official reports, local observations, and other sources (ProMED Mail, 2016). This information is then distributed directly to subscribers, of which ProMED has over 70,000, and it is posted on the ProMED website (ProMED, 2016). ProMED has proven to be an effective system of rapid dissemination of disease information.

Recommendations and Action Items:

1. ***Congress should make funding for biosurveillance and diagnostics a high-priority budget item.*** The United States government expends large resources trying to rapidly develop a vaccine that, in reality, may be only useful for the last outbreak. For example, there is still no Ebola vaccine ready to rapidly deploy, even though there are promising vaccine candidates that were rushed into clinical trials. Alternatively, point-of-need rapid diagnostic platforms and expanded laboratory capacities offer the potential to identify future outbreaks earlier and guide more aggressive public health responses that are known to be effective when activated early. Diagnostics and laboratory capacity are vital to rapid identification and pandemic control and are often overlooked as

a priority. In 2016, the CDC received a budget of $580 million for emerging and zoonotic infectious diseases, though it is not possible to tell how much of that went to diagnostics and biosurveillance. For 2017, the CDC is requesting $629 million for emerging and zoonotic diseases—an increase of approximately $50 million. Other federal departments and agencies have research and development programs for diagnostics. The NIH also supports diagnostics and biosurveillance research and development, as does DOD, USDA, and USAID. The Trump administration and Congress should work together on a new national strategy that prioritizes and brings unity of effort to diagnostic development and promotion of global laboratory capacity building in high-risk regions. Congress should authorize and appropriate the resources to the department/agencies identified in the strategy to address the gaps in human and animal diagnostics as well as global laboratory network capacity building and strengthening. Funding priorities typically go to vaccine and antiviral development, but new vaccines and drugs are very expensive; high risk; and take years, if not decades, to develop. Vaccines and drugs are two elements of disease response but are important only if available at the start of an outbreak or if they can be surged very rapidly. In terms of beginning disease response as quickly as possible, we need rapid diagnostic systems and global laboratory network capacity coupled with effective reporting systems. If necessary, funds should be shifted from vaccine development to diagnostics and biosurveillance to close this gap.

2. The United States should draw on the resources at USAID/OFDA consistently for international pandemic emergencies. Much of the funding for infectious disease outbreaks or bioterror incident response is largely *ad hoc* and dependent on emergency supplemental appropriations in the United States. Typically, when an outbreak occurs, there is not existing funding for response operations—or at least not substantial existing funding. Supplemental funding must be requested and appropriated in order to fund the emergency response. This means that funding is often not available in sufficient amounts until the outbreak is well underway or out of control. Domestically, the United States Disaster Relief Fund afforded to FEMA allows funding to be available right away for natural disaster emergency declarations. In a 2016 report, the President's Council of Advisors on Science and Technology (PCAST) suggested the establishment of a Public Health Emergency Response Fund with a funding floor of $2 billion. Although the Scowcroft Institute supports this PCAST recommendation in concept, particularly for domestic response, it is first important that the administration and Congress affirm the role of USAID/OFDA as the lead for coordinating international pandemic response. USAID/OFDA already has effective budgetary authorities for disasters that should extend to international pandemic response. Any new international emergency response authority/appropriation request from the President should be integrated with USAID/OFDA's existing authorities and not duplicated.

Because disasters and emergencies are impossible to predict, the OFDA Director has flexibility to mount an appropriate international disaster response. Giving international pandemic response authority to OFDA is the ideal solution to the reactive nature of pandemic funding. Rather than authorizing two separate agencies that are independent and potentially duplicating appropriations, Congress should consider authorizing and allocating emergency funds to OFDA and allow it to serve as the United States government emergency response funding authority to coordinate international pandemic response for the United States, in addition to its ongoing disaster response authorities and lead role responsibilities.

Additionally, OFDA currently has what is known as borrowing authority, which allows the USAID administrator to transfer up to $50 million from any USAID account into OFDA's International Disaster Assistance Account. While this is important and allows OFDA to rapidly respond to disasters, $50 million is not sufficient. We propose that the amount be raised to $200 million.

Finally, a new national strategy and appropriate resources for pandemic prevention and preparedness activities during the inter-epidemic period must be established.

Problem Topic 8: Establishing Cultural Competency

Problem Statement:

Current global disease response is top-down, applying a Westernized model that is not effective in developing countries. The United States must integrate cultural competency into disease preparedness and response.

Background:

The importance of cultural competency has never been demonstrated more starkly than it was in the 2014 Ebola outbreak in Guinea, Sierra Leone, and Liberia. Teams from WHO and across the world entered the countries with a scientifically sound plan for containing the disease. Unfortunately, they were not prepared for the cultural and religious obstacles they would encounter. This was particularly true regarding the traditional burial practices of people throughout the infected regions. At one point in the outbreak, WHO estimated that nearly 60 percent of all Ebola cases in Guinea could be linked to traditional burial practices (Manguvo & Mafuvadze, 2015).

"Unfortunately, they were not prepared for the cultural and religious obstacles they would encounter."

The religious tradition of the three most affected countries during the 2014 Ebola outbreak are Christian, Islam, and a number of local religious cultures. One thing all these religious cultures have in common is that their burial practice requires washing and/or touching the dead body in order to prepare it for burial. One local culture, the Kissi, believes that when a pregnant woman dies, she cannot be buried with her fetus, and if she is, it will have dire consequences for the living (Maxman, 2015). Thus, they must cut the fetus out of the woman's body before burial, which makes Ebola transmission all but inevitable. In the early months of the outbreak, there was suspicion of the outsiders that came to help control the disease. There was outright objection to sanitary burials. Response teams struggled with the local people, trying to force the scientifically sound practices and procedures on them. Finally, towards the later stage of the outbreak, one team brought in a cultural anthropologist from Cameroon (Maxman, 2015). This anthropologist helped find religiously appropriate ways to make reparations for not holding proper burials so that public health officials could bury the dead in a sanitary manner.

Compounding the problem of cultural differences was that 70 to 80 percent of the population in Western Africa relies on traditional medicine, which is to say they use traditional healers rather than modern, Westernized medical treatments and procedures (Manguvo & Mafuvadze, 2015). Many of the traditional healing practices require the healer to touch the sick body, leading to many healers becoming infected with Ebola and spreading it to other individuals in the population. Early on in the outbreak, traditional healers also served as sources of false information about the disease, particularly in remote, rural populations (Manguvo & Mafuvadze, 2015). During these early days, many traditional healers claimed that they could heal individuals from Ebola and dissuaded the use of modern medicine. Later on in the outbreak, however, traditional healers began to acknowledge their lack of understanding of the disease and express their desire to obtain adequate training (Manguvo & Mafuvadze, 2015).

The Ebola outbreak of 2014 demonstrated that scientific understanding is necessary, but not sufficient, for controlling an outbreak of infectious disease. Without cultural sensitivity and understanding, it can be nearly impossible to deal effectively with disease. Future disaster preparedness and response teams need to identify staff members, consultants, and local leaders that can help in disease response.

Recommendations and Action Items:

1. ***Cultural anthropologists should be consulted and included in international public health missions undertaken by the United States.*** Cultural anthropologists should be drawn from the university system and should consult with the top levels of the public health response effort. Understanding the culture and rituals of a country will greatly decrease the amount of time it takes

to get an infectious disease outbreak under control. As mentioned previously, understanding the cultural burial practices in West Africa during the 2014 Ebola outbreak may have resulted in much less loss of life.

2. *Crisis communication specialists should be included in United States pandemic response.* Trained crisis communicators should be drawn from the public sector, the private sector, or academia and appointed to facilitate communication in a country affected by infectious disease. They should work closely with cultural anthropologists to clarify and support communication challenges facing the affected population and responders. Their ultimate role should be to help responders achieve their containment goals and help the affected population better understand the pandemic they are facing.

Problem Topic 9: Expanding the Role of Universities

Problem Statement:

Universities have the knowledge base and infrastructure to educate local populations about the risk of infectious disease.

Background:

Universities are places of higher learning. Their primary role is to conduct groundbreaking research and educate future generations. While this is an extremely important role of a university, it does not have to be the only role. During outbreaks and crises, governments and nongovernmental organizations descend upon the affected region. Responders are typically new to a region and do not stay long after the outbreak has been contained. While these governments and NGOs do play a vital role in controlling the situation, they are outsiders and they are temporary. Universities, on the other hand, exist in the region day in and day out. They have established connections with the local communities and have well-educated, trusted individuals who can educate towns, villages, and cities before a disease outbreak occurs. There is also a growing network of global academic collaborations between the developing and developed world, where academicians can effectively build long-standing collaborative relationships despite political disagreements among nations.

In the United States, land-grant institutions have the responsibility of establishing extension programs. The extension programs allow research objectives to remain closely related to state needs. The university can listen to the populations' concerns, address their problems, and do research in areas the community needs the most help. Extension programs also hold classes and seminars to help community members learn new skills and improve their lives. In developing countries, universities should serve this same role. They could educate the population about the threat of infectious disease, teach them how to protect themselves, help with the response when there is an outbreak, and lead the rebuilding and learning after an outbreak.

themselves, help with the response when there is an outbreak, and lead the rebuilding and learning after an outbreak. Educating the Educating the local communities before there is an infectious disease outbreak and working with the community to rebuild following an outbreak are the two most important roles universities in developing countries can play.

Recommendations and Action Items:

1. ***Build a public health extension program to work within local communities.*** Universities are a great source of community education in the developing world. Like land-grant American universities, universities in developing countries should develop education and extension programs with a focus on issues important to the community, including public health and infectious disease. Informing communities of the threat and how to reduce it will help prevent outbreaks of infectious disease in the developing world. Universities in developing countries may also be able to pair up with individuals from WHO, FAO, OIE, HHS, DOD and USAID, who are already working in areas of public health.

2. ***Educate the entire university community about the threat of infectious disease.*** Education about infectious disease does not have to be done through formal classes. Seminars or regular programs should be established aimed at increasing awareness among the university student population. Educating students about infectious disease at this level will allow them to enter the adult population with infectious disease knowledge and will help them educate family and friends in their cities, towns, or villages.

3. ***Universities need to become responders along with government agencies and NGOs.*** In developing countries, much of the public health and infectious disease expertise and laboratory capability is already concentrated in institutes of higher learning. Because many of them already have the facilities, knowledge base, and local connections, they would be very effective partners of militaries, governments, or NGOs in infectious disease response. Working relationships between universities and other pandemic response organizations should be established prior to an outbreak so that there is less confusion when outbreak occurs.

Conclusion

Strengthening domestic and international preparedness and response to infectious disease is not a small task. In this report, we have discussed nine broad issue areas and the action items that accompany them. The United States government and international system's current reactive process for responding to infectious disease and the frequency with which infectious diseases with pandemic potential are occurring demonstrate the undeniable need to reform the international and domestic pandemic response system. Developing centralized leadership; coordinating existing agencies and departments; reforming WHO; and providing adequate funding to establish sufficient supplies, infrastructure, expertise ,and institutions are paramount to success in pandemic response. If the US ignores the challenges surrounding infectious disease, we will continue to move towards a greater and greater pandemic crisis. Foreign aid for global health and related investments has never been more important to international security and US national security. The US and the rest of the international system must recognize the enormity of the challenge and take steps to aggressively meet that challenge.

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Gerald W. Parker, Jr., DVM, PhD

Dr. Parker is a senior fellow for the Pandemic and Biosecurity Policy Programs at the Scowcroft Institute of International Affairs, Bush School of Government and Public Service; associate dean for Global One Health, Texas A&M College of Veterinary Medicine; and strategic advisor for the Institute for Infectious Animal Diseases at Texas A&M AgriLife Research. Dr. Parker also serves on several advisory boards, including the National Academies of Sciences, Engineering, and Medicine standing committee on Health Threats and Workforce Resilience; FEMA National Advisory Council; Homeland Security Science and Technology Advisory Committee; Biodefense Blue Ribbon Panel; and the Texas Task Force on Emerging Infectious Disease Preparedness and Response.

Prior to his appointment to Texas A&M University, Dr. Parker held technical to executive leadership positions throughout thirty-six years of public service as a recognized defense and civilian interagency leader in biodefense, high consequence emerging infectious diseases, global health security, and all-hazards public health/medical preparedness. This includes coordinating federal medical and public health responses to Hurricanes Katrina through Alex, the 2009 Pandemic, and the Haiti earthquake. Dr. Parker's service includes more than twenty-six years on active duty, leading medical research and development programs and organizations. He is a former Commander and Deputy Commander, US Army Medical Research Institute of Infectious Diseases. Dr. Parker held senior executive-level positions at the Department of Homeland Security, the Department of Health and Human Services (HHS), and the Department of Defense (DOD), including serving as the Principal Deputy Assistant Secretary for Preparedness and Response at HHS and Deputy Assistant Secretary of Defense for Chemical and Biological Defense at DOD.

Dr. Parker is a 2009 recipient of the Distinguished Executive Presidential Rank Award and a 2013 recipient of the Secretary of Defense Medal for Meritorious Civilian Service. Dr. Parker graduated from Texas A&M's College of Veterinary Medicine, Baylor College of Medicine Graduate School of Biomedical Sciences, and the Industrial College of the Armed Forces.

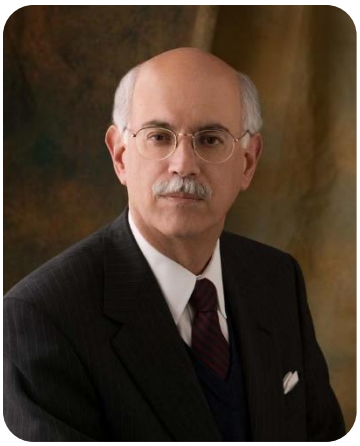
Christine Crudo Blackburn, PhD

Dr. Blackburn received her PhD in 2015 from Washington State University as part of the Individual Interdisciplinary Doctoral Program. This program requires specialization in a minimum of three fields. Dr. Blackburn chose political science, communication, and veterinary clinical sciences/global animal health. For her doctoral work, she constructed a mathematical model that allows for quantified policy and communication inputs to determine how different disease intervention policies and communication strategies impact the spread of a disease outbreak.

Following the completion of her doctoral degree, Dr. Blackburn worked as a postdoctoral researcher in the Field Disease Investigation Unit in the College of Veterinary Medicine at Washington State University. During this appointment, she worked on a variety of projects, including seasonal prevalence of *E. coli* in dairy and beef cattle, health differences from feeding dairy calves milk replacer vs. real milk, and the impact of *Bifidobacterium* on the health development of dairy calves.

Dr. Blackburn is currently a postdoctoral researcher with the Scowcroft Institute of International Affairs in the Bush School of Government and Public Service at Texas A&M, conducting research on various aspects of pandemic disease policy and control.

Andrew S. Natsios



Andrew S. Natsios is Executive Professor and Director of the Scowcroft Institute of International Affairs at the George H.W. Bush School of Government at Texas A&M University. He was Distinguished Professor in the Practice of Diplomacy at the Walsh School of Foreign Service at Georgetown University from 2006-2012 and former Administrator of the US Agency for International Development (USAID) from 2001-2006. He serves as Co-Chairman Emeritus of the Committee on Human Rights in North Korea, a research center in Washington DC. He also served as US Special Envoy to Sudan in 2006-2007 to deal with the Darfur crisis and the implementation of the South Sudan peace agreement. Retired from the US Army Reserves at a Lt. Colonel after twenty-three years, Natsios is a veteran of the Gulf War. From 1993 to 1998, he was vice president of World Vision US, the international non-governmental organization. Earlier in his career, Natsios served in Massachusetts State Government as a member of the House of Representatives in Boston for 12 years and later as Secretary of Administration and Finance, the chief financial and administrative officer of the Commonwealth. He also served in 2000-2001 as the CEO of Boston's Big Dig, the largest construction project in American history, after a cost overrun scandal.

He is the author of three books: *U.S. Foreign Policy and the Four Horsemen of the Apocalypse* (1997); *The Great North Korean Famine* (2001); and his latest book, *Sudan, South Sudan and Darfur: What Everyone Needs to Know*, published in 2012 by Oxford University Press, and has contributed to 13 other books, including two on North Korea. His areas of research are in food security, famines, and humanitarian assistance during conflict, human rights and foreign aid.

The Bush School of Government and Public Service

Mark Welsh, Dean and Holder of the Edward & Howard Kruse Endowed Chair

Founded in 1997, the Bush School of Government and Public Service has become one of the leading public and international affairs graduate schools in the nation. One of ten schools and colleges at Texas A&M University, a tier-one research university, the School offers master's level education for students aspiring to careers in public service.

The School is ranked in the top 12 percent of graduate public affairs schools in the nation, according to rankings published in *U.S. News & World Report*. The School now ranks thirty-third among both public and private public affairs graduate programs and twenty-first among public universities.

The School's philosophy is based on the belief of its founder, George H. W. Bush, that public service is a noble calling—a belief that continues to shape all aspects of the curriculum, research, and student experience. In addition to the Master of Public Service and Administration degree and the Master of International Affairs degree, the School has an expanding online and extended education program that includes Certificates in Advanced International Affairs, Homeland Security, and Nonprofit Management.

Located in College Station, Texas, the School's programs are housed in the Robert H. and Judy Ley Allen Building, which is part of the George Bush Presidential Library Center on the West Campus of Texas A&M. This location affords students access to the archival holdings of the George Bush Presidential Library and Museum, invitation to numerous events hosted by the George Bush Foundation at the Annenberg Presidential Conference Center, and inclusion in the many activities of the Texas A&M community.

The Scowcroft Institute of International Affairs

Andrew S. Natsios, Director and E. Richard Schendel Distinguished Professor of the Practice

The Scowcroft Institute of International Affairs (SIIA) is a research and policy institute housed in the Bush School of Government and Public Service at Texas A&M University. The Institute is named in honor of Lt. Gen. Brent Scowcroft, USAF (Ret.), whose long and distinguished career in public service included serving as National Security Advisor for Presidents Gerald Ford and George H. W. Bush. The Institute's core mission is to fund and disseminate policy-oriented research on international affairs, including on pandemic disease and biosecurity, by supporting Bush School and other Texas A&M faculty research, funding the publication of books and articles, offering postdoctoral fellowships, funding student internships and language immersion, bringing speakers on international affairs to Texas A&M, publishing policy and research papers in the Scowcroft Paper series, hosting major scholarly conferences, and providing grants to outside researchers to use the holdings of the Bush Library.

"We live in an era of tremendous global change. Policy makers will confront unfamiliar challenges, new opportunities, and difficult choices in the years ahead. I look forward to the Scowcroft Institute supporting policy-relevant research that will contribute to our understanding of these changes, illuminating their implications for our national interest, and fostering lively exchanges about how the United States can help shape a world that best serves our interests and reflects our values." — Lt. Gen. Brent Scowcroft, USAF (Ret.)